A66 Greta Bridge *to* Stephen Bank



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Environmental Statement

Volume 2 - Part 3 Cultural Heritage



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A66 GRETA BRIDGE TO STEPHEN BANK IMPROVEMENT

Environmental Statement Volume 2 Part 3 Cultural Heritage

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Catalogue of Cultural Heritage Sites

1 INTRODUCTION

- 1.1 In July 1998 BHWB Environmental Design and Planning were commissioned to review and update the archaeological information gathered for the above road improvement scheme, and to carry out a condition survey of the various route options. A programme of Stage 3 detailed evaluation works, comprising geophysical survey and trial trenching, was then initiated to assess the archaeological potential and impact of the scheme, in accordance with the requirements of the Department of Transport's Design Manual for Roads and Bridges, Volume 11 Environment Assessment (DOT 1994).
- 1.2 This report summarises the methodology and results of the Stage 3 fieldwork carried out to date. From this, an informed assessment of the effects of the scheme has been produced. Mitigation measures designed to offset these effects are also outlined.
- 1.3 It should also be noted that the proposed road improvement corridor is divided between County Durham in the north-west and North Yorkshire in the south-east, the boundary being a small stream just to the west of Greenbrough. The county boundary also follows part of the A66 along Stephen Bank, with North Yorkshire to the south and County Durham to the north.

2 PREVIOUSLY IDENTIFIED CULTURAL HERITAGE SITES

Archaeological sites

2.1 The combined results of a 1997 archaeological desk-top survey (NAA 1997), a Stage 2 Environmental Assessment Report (Landmark Partnership 1998, 23-25), a 1998 condition survey (BHWB 1998a), and more recent research have identified a total of 22 known or suspected archaeological sites within or immediately adjacent to the proposed road improvement corridor (see Appendix 1). These sites are shown on Figures 1a to 1d, and can be summarised as follows, from west to east:

Site	Description	NGR	
A1	Eastern vicus settlement and section of Roman road, Greta Bridge (SAM)	NZ087132 centred	
A2	Roman burial (site of), south-west of Thorpe Grange	NZ09051295 centred	
A3	Section of Roman road, Thorpe Grange	NZ09201276- NZ09501260 linear	
A4	Ridge and furrow earthworks, south of Thorpe Grange	NZ09301265 centred	
A5	Ridge and furrow earthworks and field boundaries, east of Thorpe Farm	NZ09601260 centred	
A6	Stone Stoops Bridge (site of), west of Greenbrough	NZ10151218 exact	
A7	Stone Stoops House (site of), west of Greenbrough	NZ10161219 exact	
A8	Ridge and furrow earthworks (site of), west of Greenbrough	NZ10201200 centred	
A9	Section of Roman road, Greenbrough to Stephen Bank	NZ10181219- NZ11501115 linear	
A10	Milestone (site of), Newsham Grange	NZ01581181 exact	
A11	Ridge and furrow earthworks, south-east of Newsham Grange	NZ10801160 centred	
A12	Ridge and furrow earthworks, east of Grove House	NZ10951145 centred	
A13	Possible building and other features (geophysical anomalies), south of Grove House	NZ10931135 centred	
A14	Ridge and furrow earthworks, south-east of Dyson House	NZ10901115 centred	
A15	Section of Roman road, Stephen Bank	NZ11501115- NZ12601050 linear	
A16	Ridge and furrow earthworks and small quarry, south of Rokeby Close	NZ11751110 centred	
A17	Ridge and furrow earthworks, south of Rokeby Close	NZ11681098 centred	
A18	Milestone (site of), south of Rokeby Close	NZ11831098 centred	
A19	Possible enclosure (cropmarks), east of Rokeby Close	NZ12001110 centred	
A20	Limestone quarry (site of), south-east of Rokeby Close	NZ11921090 centred	
A21	Limestone quarry, adjacent to A66/New Road junction	NZ12151077 centred	
A22	Limestone quarry, south of A66/New Road junction	NZ12231063 centred	

- 2.2 The Roman road, which ran from its junction with Dere Street near Scotch Corner west over the Stainmore Pass to the Eden Valley (Margary 1993, 433-466) is believed to date from the 1st century AD (Casey & Hoffmann 1998, 144). It continued in use throughout the period of Roman occupation and became a focus for military and, to some extent, civilian settlement. It is also probable that the road followed a pre-existing communications corridor, and a number of small pre-Roman Iron Age settlements and field systems have been identified on, and in close proximity to, the present A66 alignment. While many of these have been located from aerial photographic evidence, some have also been subject to archaeological investigation; the extra-mural settlements (*vicus*) at Greta Bridge were investigated in 1972-74 in advance of road improvements over the Stainmore Pass in the early 1990s were also preceded by a major archaeological recording project, which investigated many sites of all periods (Vyner 2001).
- 2.3 The existing A66 to the east of Greta Bridge is thought to more-or-less follow the alignment of the Roman road. Margary considers the slight bends at Smallways, Newsham Grange and near Greta Bridge to be features of the original road (Margary 1993, 434), although the modern Ordnance Survey maps depict the alignment running to the north of Newsham Grange and Grove House. It was therefore considered that the Greta Bridge to Stephen Bank road improvement corridor had some archaeological potential, both in terms of the Roman road itself and for as yet undiscovered Roman and possibly medieval sites in the vicinity. The earlier desk-top survey reports made it clear that the potential impact of the scheme could not be assessed until further information on the historic resource had been obtained.

Built environment

2.4 Eleven listed buildings of special architectural or historic interest were identified within or immediately adjacent to the proposed road improvement corridor (see Appendix 1). These sites are shown on Figures 1a to 1d, and can be summarised as follows, from west to east:

Site	Description	NGR
B1	Rokeby House, The Cottage and Gable End (LB II, ref 14/127)	NZ08881305 exact
B2	Farm buildings to west of Thorpe Grange Farmhouse (LB II, ref 6/192)	NZ09301282 exact
B3	Coach-house range to north of Thorpe Grange Farmhouse (LB II, ref 6/191)	NZ09331280 exact
B4	Thorpe Grange Farmhouse (LB II, ref 6/188)	NZ09431278 exact
B5	Walls, railings and gatepiers to south of Thorpe Grange Farmhouse (LB II, ref 6/189)	NZ09321278 centred
B6	Milestone, 30m south-east of Thorpe Grange Farmhouse (LB II, ref 6/190)	NZ09341275 exact
B7	Thorpe Farmhouse and adjacent outbuildings (LB II*, ref 6/187)	NZ09381273 exact
B8	Greenbrough House (LB II, ref 2/85)	NZ10441195 exact
B9	Newsham Grange (LB II, ref 2/86)	NZ10611181 exact

B10	Coach-house c.18m north of Newsham Grange (LB II, ref 2/87)	NZ10651184 exact
B11	Guide post opposite Smallways Inn (LB II, ref 2/88)	NZ11181115 exact

2.5 There are other, non-listed buildings within the proposed road improvement corridor, but these are not physically affected by the scheme and so are not considered here (see below for visual impacts).

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3 GEOPHYSICAL SURVEY

Introduction

- 3.1 The geophysical survey was undertaken as two linked phases of work, Phase 1 concentrating on the west end of the scheme around Thorpe Grange and Thorpe Grange Cottages, while Phase 2 considered the area to the east, between Newsham Grange and Smallways. In all, some six hectares were surveyed, divided between 13 separate areas; the locations of the survey areas are indicated on Figures 1a to 1d, while more detailed plans are provided in the geophysical survey technical report.
- 3.2 The geophysical survey was undertaken by GeoQuest Associates, working as sub-contractors to BHWB Environmental Design and Planning. The final geophysical survey report was produced in February 1999 (GeoQuest Associates 1999).

Methodology

- 3.3 The methodology for the geophysical survey was defined by a specification produced by BHWB Environmental Design and Planning (BHWB 1998), which took account of comments made by the County Archaeological Officers for North Yorkshire and County Durham. The surveys were conducted using GeoScan FM36 fluxgate gradiometers and data was collected in 20m square grids with readings taken at 1.0m by 0.5m intervals, thus providing 800 measurements per grid. The grids were tied into the Ordnance Survey National Grid and other survey stations.
- 3.4 The site survey work took place between September and November 1998 in poor weather conditions, and the survey of one area (Area G2) had to be abandoned due to waterlogged ground. The location and extent of the individual survey areas was determined by the base scheme and four separate route options which were under consideration at the time.

Summary of Results

3.5 In general, all the survey areas exhibited numerous dipolar magnetic anomalies, a fact not unexpected given the proximity of the existing road corridor. The smaller magnetic features are likely to represent near-surface ferrous debris and litter, while the larger examples are associated with telegraph poles, buried service pipes, land drains, fences, and feeding troughs. In addition, some magnetic lineations are likely to be of natural, geological origin. Nevertheless, some areas of possible archaeological potential were recognised. For ease of description in the following text, each survey area is considered to be aligned east-west, and the results are described in scheme order, from west to east.

Area G1

3.6 Survey area G1 was divided into three discrete blocks, measuring 100m by 20m (Area G1W), 150m by 20m (Area G1C), and 100m by 80m (Area G1E), all on the south side of the A66 opposite Thorpe Farm, towards the west end of the scheme. Land use in all three areas was pasture. The survey was required to try and determine whether any sub-surface remains associated with the possible Roman cemetery (Site A2) and/or the Roman Road (Site A3) extended into the area to be disturbed by the road improvement scheme.

3.7 In Area G1W, a former field boundary was identified towards the west end of the survey area, while anomalies of what is likely to be ridge and furrow cultivation were seen in Areas G1C and G1W; it is noticeable that the ridge and furrow in Area G1C is parallel to existing field boundaries whereas that in Area G1W is not. Other as yet unexplained linear anomalies, possibly geological in origin, were also seen running across the ridge and furrow on the east side of Area G1E. The surveys did not appear to detect any evidence for a possible Roman road alignment on the south side of the existing A66, or for any continuation of a possible roadside cemetery. The field boundary identified in Area G1W is not depicted on the Ordnance Survey 1st edition (1857) 6" map.

Areas G3 and G4

3.8 Survey areas G3 and G4 lay on the south side of the A66, opposite Newsham Grange and west of Dyson Lane. Area G3 measured 80m by 40m while Area G4 measured 160m by 40m. Both areas lay within arable land, area G3 having just been sown with oil seed rape while Area G4 was due to be planted. The geophysical survey was required to try and detect any below-ground archaeological features or deposits which might be affected by the proposed road improvement scheme. In the event, no geophysical anomalies were identified in either survey area.

Area G5

- 3.9 Survey area G5 was divided into two areas, both on the south side of the A66 and to the east of Dyson Lane. Area G5W measured 180m by 40m and lay within a pasture field, while Area G5E was 90m by 20m. Once again, the survey was required to try and identify any below-ground archaeological features or deposits.
- 3.10 In Area G5W two parallel, weak negative lineations were thought to represent rubble land drains. A further set of stronger anomalies was considered to represent a buried water pipe. In Area G5E, positive and negative linear anomalies were interpreted as a small structure and possibly three interrupted curvilinear ditches, apparently associated with or overlain by narrow ridge and furrow cultivation remains; these ditches may be of prehistoric origin (see Site A13).

Area G6

3.11 Survey area G6 was an irregularly-shaped block on the north side of the A66 to the west of Grove House. The main part of the area measured 140m by 40m, and the field was planted with young barley. Possible stone wall footings or more probably land drains were identified in the north-west corner of the area, while a small, soil-filled structure was seen to the north of a ferrous water pipe.

Area G7

3.12 Survey area G7 lay to the east of Grove House and was divided into three discrete areas on both sides of the Smallways Beck. Area G7W measured 120m by 40m, Area G7C measured 140m by 40m, and Area G7E measured 60m by 40m. All three areas lay within pasture fields. These areas, together with Survey areas G6 and G8 to the west and east, were designed to assess a northern off-line route option which was then under consideration. The geomagnetic image for the western end of Area G7W was dominated by the effects of farm buildings and fences, but no anomalies of archaeological interest were detected in any of the survey areas.

Area G8

3.13 Survey area G8 was located on the north side of the A66, either side of the A66/Lanehead Lane junction. Area G8W lay to the west and measured 160m by 40m, and Area G8E was 40m square block to the east. The western field had recently been planted with wheat while the field to the east was pasture. A very weak and diffuse magnetic lineation in Area G8W may represent the ploughed-down remains of the former Roman road alignment, depicted on a parallel course on modern Ordnance Survey maps (Site A9). No anomalies were identified in Survey area G8E.

4 MONITORING OF GEOTECHNICAL EXCAVATIONS

Introduction

- 4.1 As part of the archaeological assessment programme, it was decided to monitor the excavation of a series of geotechnical test pits which were dug along the south side of the existing A66. Test pits 101 to 105 at Thorpe Grange, test pit 120 at Newsham Grange, and test pits 133 to 143 from Lanehead Lane to Stephen Bank, were monitored. The pits measured up to 3.0m long and 0.7m wide and up to 2.5m deep, and all were all dug within the existing wide grass verge.
- 4.2 The purpose of the monitoring exercise was to identify any underlying archaeological deposits, and to see whether an earlier road sub-base had been prepared within the wide verge as part of an earlier, unfinished, widening scheme. The archaeological monitoring was undertaken by Northern Archaeological Associates (NAA) for EDAS, in September 1999 (Simpson 1999).

Summary of Results

- 4.3 With the possible exception of one test pit (TP 143 at the extreme east end of the scheme on Stephen Bank see figure 1d), no evidence for any pre-existing, laid sub-base was identified, nor was there any evidence for surfaces or features which could be interpreted as being indicative of the course of the earlier Roman road.
- 4.4 Most test pits revealed a substantial depth of made-up ground (broken up road sub-base, tarmac and/or redeposited aggregates and soils), generally overlying undisturbed, glacially-derived, natural clays and sands. It was therefore concluded that previously existing topsoils had been removed when the existing A66 and associated verges were constructed. This action would have destroyed most archaeological deposits if present, apart from substantial negative features such as deep ditches which might have been cut into glacial material.
- 4.5 Test pits which showed a normal, undisturbed soil profile lay at the west end of the scheme (TPs 101, 103 and 105), and to the south of Rokeby Close (TP 133) (see Figures 1a and 1c). In these areas, archaeological features may survive in the existing verges.

5 TRIAL EXCAVATIONS

Introduction

- 5.1 A total of seven evaluation trenches in three separate areas were excavated within the proposed road improvement corridor (see Figures 1a to 1d). The total area of excavation amounted to 354 m².
- 5.2 The excavations took place in November 1999, and were carried out by Northern Archaeological Associates (NAA), working as sub-contractors to BHWB Environmental Design and Planning. The final report on the excavations was produced in March 2000 (NAA 2000).
- 5.3 The general objectives of the trial excavations were as follows:
 - to confirm the results of the previous geophysical survey, and to test for the presence of any archaeological deposits or features associated with the geophysical anomalies;
 - to identify, as far as possible given the constraints of the trenching proposals, any archaeological deposits or features within the various fieldwork areas not identified by any previous stages of investigation;
 - to determine the date, nature, depth and stratigraphic complexity of any archaeological features and deposits within the various fieldwork areas;
 - to provide an assessment of the potential and significance of any identified archaeological deposits and features in a local, regional and (if necessary) national context, and to contribute towards an assessment of the likely scope, cost and duration of any further evaluation and/or excavation works that might be required to mitigate against the proposed road improvement proposals.
- 5.4 Where appropriate, more specific objectives relating to individual sites are described below.

Methodology

- 5.5 The methodology for the trial excavations was defined in a specification produced by EDAS (1999) on behalf of BHWB, which took account of comments made by the County Archaeological Officers for County Durham and North Yorkshire, English Heritage and the Highways Agency. Trenches were positioned to sample geophysical anomalies and to test for the survival of the Roman road, where this alignment was thought to coincide with the proposed road corridor.
- 5.6 Topsoil was removed from each trench by mechanical excavator under direct archaeological supervision, down to the top of any archaeological features and/or deposits, or the natural sub-soil. Any archaeological features thus exposed were to be cleaned and recorded in plan, and selected features were to be partially excavated by hand; excavation and recording was undertaken in sufficient detail to achieve the aims of the evaluation exercise. In many cases an additional sondage was excavated to confirm the presence of natural deposits. Weather conditions during the majority of the trenching programme were poor, with heavy rain and wind leading to localised waterlogging.

Summary of results

Area G1

- 5.7 Three trenches were opened near the west end of the scheme. Trench G1/1 was located in rough grassland on the south side of the A66 opposite Thorpe Grange (at NGR NZ09241274). The trench measured 20m by 2m and was designed to identify any Roman road deposits or any continuation of the ridge and furrow-type anomalies noted by the previous geophysical survey (survey area G1C). However, no archaeological deposits were identified in the trench.
- 5.8 Trench G1/2 lay further to the east, and was again located on the south side of the A66 (at NGR NZ09421260). It measured 20m by 2m and was designed to identify any underlying Roman road deposits. Once again, no archaeological deposits were noted in the trench.
- 5.9 The third trench (G1/3) measured 8m by 3m and was located within the existing south A66 verge, just to the north-east of Thorpe Grange Cottages (at NGR NZ09541254). It was orientated north-south across an earlier, now abandoned section of the road which was thought to represent one of the former Roman road alignments. However, no evidence of archaeological activity was noted the former road surface consisted of 0.3m depth of tarmac laid directly onto sand.

Area G7

5.10 Three trenches were located to the south-east of Grove House and north of the existing A66, along a revised route option to the south of the area previously investigated by geophysical survey; the positions of the trenches were randomly selected. Trench G7/2 (at NGR NZ10991136) measured 30m by 2m, trench G7/3 (at NGR NZ11061135) was 20m by 2m, and trench G7/4 (at NGR NZ11241127) measured 30m by 2m; all were within pasture fields. Once again, none of the trenches contained archaeological features.

Area G8

5.11 Trench G8/5 was located on the east side of the A66/Lanehead Lane junction, in a pasture field (at NGR NZ11501118). The trench measured 30m by 4m and was positioned over the anticipated course of the Roman road, as depicted on the modern Ordnance Survey maps. However, no archaeological features were identified in the trench.

6 CONCLUSIONS FROM STAGE 3 FIELDWORK

- 6.1 Overall, the results of the Stage 3 fieldwork were disappointing. The geophysical surveys failed to find any conclusive evidence for any Roman road alignments, although a weak and diffuse linear anomaly seen in geophysical survey area G8W does broadly coincide with the course of the Roman road as depicted on the modern Ordnance Survey maps. Two possible wall footings, or large stone land drains, were noted in geophysical survey area G6, together with small irregular soil-filled feature. Geophysical survey area G5E also contained some potentially prehistoric features represented by a small structure and possibly three interrupted curvilinear ditches (site A13). However, all these survey areas lie outside the revised route option and none of the anomalies were able to be tested by trial excavation. A probable field boundary and evidence of ridge and furrow cultivation was also identified in geophysical survey areas G1W and G1C (site A4).
- 6.2 The albeit limited programme of trial trenching also failed to reveal any firm evidence for Roman road alignments, beyond the existing road corridor. The absence of any flanking ditches in Trench G8/5, which was dug across the course of the road as shown on modern Ordnance Survey maps, makes it unlikely that the road could have been completely removed by agricultural activity. It is therefore concluded that Roman road levels will lie beneath the existing A66 for a large part of its length, apart from the modern realigned sections such as at Greenbrough. Recent work has shown that Roman surfaces can survive beneath modern trunk roads (Mudd 1998; Vyner 2001, 88-89), and so this part of the existing A66 has some archaeological potential.

7 ASSESSMENT OF THE EFFECTS OF THE PROPOSALS

Introduction

- 7.1 The effects of the construction and landscaping proposals, as currently proposed, on the sites and areas of cultural heritage interest identified by the completed Stage 3 fieldwork have been assessed. It should be noted that the effects resulting from off-site planting, accommodation works, haul routes, construction compounds or temporary construction roads have not been considered.
- 7.2 For archaeological sites and monuments, the main impacts arising from road construction are likely to be:
 - possible disturbance and/or destruction of archaeological deposits from works associated with the scheme, whether from actual construction or works associated with secondary operations such as landscaping, balancing ponds, site compounds and borrow pits;
 - increased visual intrusion;
 - increases in noise, vibration and disturbance;
 - severance from other linked features such as field systems, agricultural complexes and landscapes;
 - changes in the original landscape;
 - loss of amenity.
- 7.3 For the built environment, the main impacts arising from road construction are likely to be:
 - possible demolition, or loss of part of the structure or grounds of a listed building;
 - increased visual intrusion;
 - increases in noise, vibration and disturbance;
 - severance from other linked features such as gardens, outbuildings, lodges etc;
 - changes in the original landscape, townscape or garden setting of the house or building;
 - loss of amenity.

The Development Proposals

Scheme description

7.4 A detailed description of the scheme is contained in Section 2 of Volume 1 of the Environmental Statement. However, the main features can be summarised as follows:

- the existing A66 would be retained for two lanes of traffic in one direction;
- a new two-lane carriageway would be constructed to the southern side of the existing carriageway, except between Grove House and Rokeby Close where the new carriageway is proposed to the north of the current alignment;
- the construction of a new bridge and associated embankments for the new eastbound carriageway over Smallways Beck;
- new, 'all-movement', at grade, staggered junction at Smallways, between Low Lane and Lanehead Lane;
- widened central reserve crossings would allow 'all-movement' access to/from Thorpe Grange and Whorlton Lane, Newsham Grange and from Browson Bank;
- access onto the A66 from Dyson Lane would be stopped up, except for nonmotorised users;
- direct accesses onto the A66 from Thorpe Grange Cottages, Sloper House, Stoney Stoops and Grove House would be stopped up, with new private means of access (PMA) providing alternative routes onto the A66;
- new bridleways parallel to the south side of the A66 between Rokeby House and Thorpe Farm, Stoney Stoops and Newsham Grange junction, and continuing onto Dyson Lane;
- new lay-bys would be provided for eastbound traffic west of Sloper House and for westbound traffic west of Stoney Stoops;
- no lighting would be provided along the improvement scheme;
- balancing ponds and a retention ditch would be provided at four locations along the route, to regulate discharge into existing watercourses.

Modifications to the proposed construction corridor

7.5 The archaeological information collated from the desk-top research and the subsequent Stage 3 surveys was used to help influence the alignment and design of the proposed scheme. In particular, the presence of a possible building (Site A13) and one possible alignment of the Roman road (A9) to the south and north of Grove House respectively, were contributory factors in deciding that the new carriageway should run close to the north side of the existing A66 between Grove House and Stephen Bank.

Impact of Development

7.6 When making an initial assessment of the impact of the proposed scheme on the known sites of cultural heritage interest, all construction works as currently proposed have been taken into account.

Grading systems

7.7 Using a combination of professional judgment, the Secretary of State's criteria for scheduling ancient monuments and listing buildings, and the criteria developed by English Heritage in their Monuments Protection Programme, an initial Ó

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assessment of the grade of importance of each cultural heritage site or area within the proposed construction corridor can be made.

- 7.8 Guidance given in DMRB volume 11 suggests that a four tier importance grading system can be applied to archaeological sites, namely National, Regional or County, District or Local, and sites which are so badly damaged that so little now remains to justify their inclusion in a higher grade (DOT 1994, 3/1). This importance-grading scheme is also used here, although the District and Local grade is sub-divided to differentiate between sites at the lower end of the scale.
- 7.9 The importance of the built environment can be graded according to whether the structures are listed or not. The various grades for Listed Buildings are also hierarchical, Grade I buildings being of exceptional interest, Grade II* buildings being particularly important buildings of more than special interest, and Grade II buildings of special interest (DOT 1994, 9/1). In order to correlate with the archaeological grading system, and following established guidance, Grade I and II* buildings are considered to be of National Importance while Grade II buildings are considered to be of Regional or County importance.
- 7.10 In order to help to assess the impact of the proposals on the identified sites and areas of archaeological or architectural importance, a three tier impact grading system has been devised, based on the scale of impact of the proposals, namely:

Major impact:	Major disturbance (i.e. more than <i>c</i> .75% of the area of known or estimated archaeological deposits).			
Significant impact:	Significant disturbance (i.e. between $c.25\%$ and $c.75\%$ of the area of known or estimated archaeological deposits).			
Small-scale impact:	Minor disturbance (i.e. less than <i>c</i> .25% of the area of known or estimated archaeological deposits).			

In drawing up this information, consideration has also been made of the scale, significance, potential and current condition of the site, defined as the grade of the site.

7.11 A combination of the impact of the proposals and the grade of importance or potential of each site can then be used to produce an assessment of overall adverse impact, defined as being substantial, moderate or slight.

Archaeological sites

7.12 Following the results of the Stage 3 assessments, and taking into consideration the amendments made to the proposed road improvement corridor, it can be seen that a total of ten surviving archaeological sites will be affected by the current scheme, as follows. Sites already assessed as being completely destroyed are not included here.

Site	Site name	Importance
A2	Roman burial (site of), south-west of Thorpe Grange	Regional
A3	Section of Roman road, Thorpe Grange	Regional
A4	Ridge and furrow earthworks, south of Thorpe Grange	Local
A5	Ridge and furrow earthworks and field boundaries, east of Thorpe Farm	Local
A9	Section of Roman road, Greenbrough to Stephen Bank	Regional
A11	Ridge and furrow earthworks, south-east of Newsham Grange	Local
A12	Ridge and furrow earthworks, east of Grove House	Local
A15	Section of Roman road, Stephen Bank	Regional
A16	Ridge and furrow earthworks and small quarry, south of Rokeby Close	Local
A21	Limestone quarry, adjacent to A66/New Road junction	Local

- 7.13 The greatest impacts will occur on the presumed Roman road between Greenbrough and Stephen Bank (Sites A9 and A15). As noted above, there is presently no firm evidence for its alignment to the east of Greenbrough; it may continue east in a straight line to the north of Grove House, or it may follow the old A66 route across Smallways Bridge. Either way, the creation of a local access road along the old A66 alignment to the west of Greenbrough, the remodelling of the Lanehead Lane and Smallways junctions, and the creation of a balancing pond and a new carriageway on the north side of the existing A66 to the east of Lanehead Lane could have implications for any underlying archaeological deposits associated with Roman road alignments. There may also be smaller scale impacts on the section of Roman road at Thorpe Grange (Site A3) associated with the remodelling of the Whorlton Lane junction and the creation of a layby on the north side of the carriageway to the east of this junction. Health and safety and other considerations meant that it was not possible to assess whether any Roman road surfaces, or any associated features such as roadside ditches, quarry pits, marking-out lines, or even milestations, survive within the existing road corridor as part of the Stage 3 investigations mentioned above.
- 7.14 There will also be limited impacts on areas of ridge and furrow earthworks, to the south of Thorpe Grange (Site A4), south-east of Newsham Grange (Site A11), east of Grove House (Site A12), and south of Rokeby Close (Site A16). These impacts result from the construction of a bridleway, local access roads, and the new carriageway. The creation of a bridleway and a water retention ditch at the west end of the scheme may also affect any additional Roman burials (Site A2), which may be present in this area. Finally, the creation of a new carriageway on the south side of the existing A66 on Stephen Bank will have some limited impact on a former limestone quarry (Site A21).
- 7.15 Based on current knowledge, the ten affected sites within the proposed road improvement corridor can be graded in terms of importance as being Regional or County (four sites) and Local (six sites). The scale of impact can be categorised as being Major (one site), Significant (two sites), and Small-scale (six sites), while overall adverse impacts can be categorised as Substantial on one site, Moderate on two sites and Slight on seven sites; the worse impacts are on the Roman

burial south-west of Thorpe Grange (Site A2) and two sections of the presumed Roman road alignment between Greenbrough and Stephen Bank (Sites A9 and A15). Full details of the grades of importance, and levels and details of impact for each of the affected archaeological sites, can be found in Table 1.

Built environment

7.16 None of the eleven listed buildings will be directly affected by the scheme, and their settings will actually be slightly improved by the re-alignment of the A66 away from them. This matter is covered elsewhere in the Environmental Statement. No non-listed buildings will be demolished by the scheme.

8 MITIGATION MEASURES

Introduction

- 8.1 Archaeological remains survive both as upstanding earthworks or as buried features. All remains will be susceptible to damage and/or destruction as a result of ground disturbance associated with the construction of these proposals and their related landscaping or enhancement works.
- 8.2 The removal of topsoil and subsoil is likely to destroy most archaeological deposits and, even where embankments and other construction methods are used to raise the overall ground level, preparatory works often result in the destruction of any archaeological deposits which lie at shallow depths. In addition, while the burying of archaeological features beneath a development can sometimes be an accepted form of preservation *in situ*, this is not always the case and care must be taken to ensure that any significant deposits are not subject to undue compaction and shrinkage. Some form of monitoring might be required to ensure that this does not happen.
- 8.3 Possible mitigation measures for archaeological sites have been described in the DMRB volume 11 (DOT 1993, 7/1) as:
 - locate the route away from archaeological remains and their settings;
 - design the scheme's vertical alignment and associated earthworks so that archaeological remains are not disturbed;
 - provide for an excavation and recording of remains before the start of earthmoving;
 - provide for an archaeologist to be 'on call' so that any finds during construction can be recorded.

In practice, a combination of these measures is often used.

- 8.4 Listed buildings and other elements of the built environment are, by definition, upstanding structures. In addition to demolition, they are particularly susceptible to increased visual intrusion, noise, vibration and disturbance and severance from other linked and associated features.
- 8.5 Possible mitigation measures for the built environment have been described in the DMRB volume 11 (DOT 1993, 12/1) as:
 - locate the route away from historic buildings or sites. Demolition of these features should be avoided wherever possible;
 - keep a route low within the natural topography to exploit any natural screening and enhance this by the use of cuttings and, in exceptional circumstances, tunnels. These measures will also help to reduce noise and vibration.
 - use other landscaping techniques to integrate a scheme into its setting.

In practice, a combination of these measures is often used.

Phases of Investigation

- 8.6 It is envisaged that five separate phases of work will be required to ensure that the cultural heritage of the area covered by the proposals have been considered to an appropriate standard. The results of each phase will influence and set the parameters for the next. Phases 1 to 2 deal with the assessment and preconstruction works, phase 3 deals with the recording of archaeological deposits while construction is in progress, and phases 4 and 5 deal with the assimilation, publication and deposition of any results resulting from the previous phases. In detail, these phases comprise:
 - Phase 1: Detailed evaluation. Initial and intensive fieldwalking, geophysical survey, earthwork survey, trial trenching and initial building assessment as appropriate, leading to the detailed assessment of impact and recommendations for mitigation (DMRB Stage 3).
 - Phase 2: Pre-construction investigation. Detailed excavation and architectural recording in advance of construction of those sites identified during the previous phase to be of significant archaeological or architectural importance and for which no appropriate mitigation measures can be sought.
 - Phase 3: Watching brief during construction. Investigation and recording of those sites identified during the DMRB Stages 1 to 3 as not warranting prior investigation, as well as the recording of sites which may be exposed during the course of development.
 - Phase 4: Post-excavation assessment. Assessment of the results of the archaeological investigations and the potential of the data for analysis leading to recommendations, timetable and costings for subsequent detailed analysis, publication, storage and deposition.
 - Phase 5: Post-excavation analysis and publication. Data analysis, report preparation and publication followed by deposition of the archive and artefacts and all other materials associated with the investigations with the appropriate institution for long term storage and curation.

Archaeological Sites

- 8.7 The effects the scheme might have on the archaeological resource were considered from an early stage. In all cases, and with all other constraints and environmental factors being equal, the physical preservation of an archaeological site would be the preferred option. The archaeological excavation of deposits (preservation by record) is seen as a last resort, and would only be undertaken when all other avenues have been considered and discounted.
- 8.8 The Phase 1 detailed evaluation works described above correspond to Stage 3 of the Department of Transport's Stages of Archaeological Assessment as defined in DMRB volume 11 (DOT 1994). The majority of this work has been completed and is summarised above. The only outstanding element of this phase is a limited programme of additional trial trenching which will take place at a later date, in advance of construction.
- 8.9 The results of the Phase 1 works completed to date have helped to assess the alignment of the Roman road in relation to the existing A66. The results have also enabled specific recommendations to be made for appropriate mitigation works, both in advance of and during construction. Two approaches have been

adopted, preservation in situ (ie. burying the archaeological deposits) and preservation by record (ie. full archaeological excavation and recording in advance of development).

8.10 The proposed mitigation measures can be defined in terms of the phases of investigation outlined above. These are discussed below and the extent of the works is shown on Figures 2a to 2d. A summary of the proposed mitigation measures, from west to east, is given in Table 1.

Phase 1 Detailed evaluation works

- 8.11 Additional trial trenching will be undertaken in the areas of Thorpe Grange, to the west of Greenbrough, on the west side of the Lanehead Lane junction, and in the area of the proposed balancing pond and new carriageway at the base of Stephen Bank. This work will test for any survival of Roman road and other deposits below abandoned carriageways.
- 8.12 These additional intrusive works would not involve any disruption to existing traffic flows and, as the results may influence the scale of subsequent work, would be undertaken well in advance of construction. Should any significant deposits and features be identified, the appropriate areas would be subject to further preconstruction investigation as outlined below.

Phase 2 Pre-construction excavation and recording

- 8.13 It is proposed that Phase 2 pre-construction topographical survey would take place at three of the earthwork sites affected by the scheme, namely the areas of ridge and furrow to the south of Thorpe Grange (Site A4), east of Grove House (Site A12), and to the south of Rokeby Close (Site A16). The other areas of earthworks affected by the scheme, to the east of Thorpe Farm (Site A5) and south-east of Newsham Grange (Site A11), are severely denuded and are not considered to be worthy of recording.
- 8.14 No pre-construction excavation is currently proposed, although it is possible that any positive results from the Phase 1 trenching may lead to some being required. If so, it is envisaged that this work would be achieved by the careful stripping of the topsoil from the proposed road corridor, and then the recording and selective excavation of features and deposits that are revealed; the amount of detailed, open-area excavation is likely to be small. This work would effectively clear these areas of archaeological deposits, to allow for an uninterrupted construction programme.
- 8.15 Any extra field walls which will be affected by the scheme should be subject to a Phase 2 recording programme (not shown on Figures 2a to 2d). This work should comprise a Level 2 architectural survey as defined by the RCHME, comprising photographic and descriptive elements (RCHME 1996).
- 8.16 Finally, any items of street furniture, such as milestones or mileposts not previously identified by the desk-top and related surveys, should be recorded *in situ* and then removed to alternative and appropriate locations, if they are to be affected by the works.

Phase 3 Watching brief during construction

- 8.17 A Phase 3 watching brief would be carried out during the initial phases of construction in the remaining areas considered to be of archaeological importance or potential. This would include the area of the presumed Roman road alignment and the site of earlier Roman burials in the area of, and west of, Thorpe Grange, in the area of the proposed layby to the east of Thorpe Grange, around Smallways, and along Stephen Bank.
- 8.18 In view of the results of the Stage 3 works obtained to date, it is not proposed to undertake a standard watching brief along the rest of the scheme corridor, outside the areas noted above.

Phase 4 and 5 Post-excavation assessment, analysis and publication

8.19 The precise scale and scope of these phases cannot at present be determined, but the work would be commensurate with the nature and scale of any discoveries made during the preceding phases.

Built Environment

8.20 None of the listed buildings will be directly affected by the proposals. Mitigation measures designed to off-set the adverse visual impacts for the various listed buildings and other elements of the built environment would normally be achieved through appropriate landscaping techniques, and these have been considered elsewhere in the Environmental Statement.

9 REFERENCES

BHWB 1998a A66 Greta Bridge to Dyson Lane Improvements: Archaeological Condition Survey

BHWB 1998b A66 Greta Bridge to Dyson Lane Improvements and A66 Melsonby Crossroads to Scotch Corner Improvements: Contract and Specification for Geophysical Survey

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A66 GRETA BRIDGE TO STEPHEN BANK IMPROVEMENT - VOLUME 2 PART 3: CULTURAL HERITAGE

TABLE 1: IMPACT OF DEVELOPMENT AND PROPOSED MITIGATION MEASURES

Site no	Site name	Grade of site	Nature of Impact	Scale of Impact	Overall adverse Impact	Proposed Mitigation
A2	Roman burial (site of), south-west of Thorpe Grange	Regional	Disturbance involves construction of water retention ditch in verge parallel to existing carriageway, regrading of south cutting slope and construction of bridleway on south side of new slope	Major	Substantial	Phase 3 watching brief
A3	Section of Roman road, Thorpe Grange	Regional	Disturbance limited to construction of new access to Thorpe Grange, remodelling of Whortton Lane junction, and private access road and balancing pond at Whortton Lane. Further east, new layby on north side of existing carriageway.	Small-scale	Slight	Phase Combination of Phase 1 detailed evaluation (trial trenching) and Phase 3 watching brief
A4	Ridge and furrow earthworks, south of Thorpe Grange	Local	Construction of new bridleway and cutting requires landtake of <i>c</i> .30m.	Small-scale	Slight	Phase 2 pre- construction recording (earthwork survey)
A5	Ridge and furrow earthworks and field boundaries, east of Thorpe Farm	Local	Construction of private access road to Whortton Lane affects small area of earthworks.	Small-scale	Slight	No action - earthworks not well preserved in affected area
A9	Section of Roman road, Greenbrough to Stephen Bank	Regional	Construction of new access road along former A66 alignment and some new planting west of Greenbrough. Construction of new carriageway across presumed alignment west of Smallways, and new road layout east of Smallways.	Significant	Moderate	Phase 1 detailed evaluation (trial trenching) with subsequent Phase 2/3 work as necessary
A11	Ridge and furrow earthworks, south-east of Newsham Grange	Local	Limited disturbance caused by re- alignment of local access road.	Small-scale	Slight	No action - earthworks not well preserved in affected area
A12	Ridge and furrow earthworks, east of Grove House	Local	Construction of new carriageway involves landtake of c.25m on north side of existing carriageway.	Small-scale	Slight	Phase 2 pre- construction recording (earthwork survey)

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A66 GRETA BRIDGE TO STEPHEN BANK IMPROVEMENT - VOLUME 2 PART 3: CULTURAL HERITAGE

TABLE 1: IMPACT OF DEVELOPMENT AND PROPOSED MITIGATION MEASURES

Site no	Site name	Grade of site	Nature of Impact	Scale of Impact	Overall adverse Impact	Proposed Mitigation
A15	Section of Roman road, Stephen Bank	Regional	Construction of local access road and re-modelling of Lanehead Lane junction. Construction of new carriageway on north side of existing A66 involves landtake of c.30m to east of Lanehead Lane, and construction of new carriageway in existing southern verge.	Significant	Moderate	Combination of Phase 1 detailed evaluation (trial trenching) and Phase 3 watching brief
A16	Ridge and furrow earthworks and small quarry, south of Rokeby Close	Local	Construction of new carriageway on north side of existing A66 involves landtake of c.30m to east of Lanehead Lane - affects ridge and furrow but part of area recently planted. New balancing pond within site.	Small-scale	Slight	Phase 1 detailed evaluation (trial trenching) on pond site. Also Phase 2 pre- construction recording (earthwork survey)
A21	Limestone quarry, adjacent to A66/New Road junction	Local	Construction of new carriageway on south side of existing A66 involves some minor disturbance.	Small-scale	Slight	Phase 2 pre- construction recording (methodology to be decided)

FIGURES